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Application No.: 10/686,083

Docket No.: 070702009310

AMENDMENTS**In the Claims:**

The listing of claims below replaces all previous listings and versions for this application.

1. (Currently amended) An apparatus comprising:

[[a.]] an analysis chamber containing one or more cantilever structures, wherein each ~~structure comprises the~~ cantilever structures comprise one or more covalently attached partially double stranded nucleic acid templates, and wherein the cantilever structures are fabricated to respond to a mass dependent property change, deflection, or resonant frequency shift of the cantilever structures produced by changes in mass of the attached templates by addition of at least one complementary mass labeled nucleotide;

[[b.]] one or more reagent reservoirs in fluid communication with the analysis chamber;

[[c.]] a detection unit operably coupled to the cantilever structures; and

[[d.]] a data processing and control unit operably coupled to the chamber, one or more reservoirs, and the detection unit;

further comprising one or more polymerases in the analysis chamber which incorporate the complementary mass labeled nucleotide in a position complementary to a nucleotide of the attached templates.

2. (Previously presented) The apparatus of claim 1, wherein the one or more nucleic acid templates attached to the structures are about 10 to about 100,000 nucleotides in length.

3-4. (Canceled)

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5. (Original) The apparatus of claim 1, wherein the detection unit comprises a position sensitive photodetector, a piezoelectric detector or a piezoresistor.

6. (Original) The apparatus of claim 1, wherein the detection unit comprises a laser.

7. (Currently amended) The apparatus of claim [[4]] 1, wherein the detection unit detects a mass property change of the cantilever structures, deflection of the cantilever structures, or resonant frequency shift of cantilever structures produced by the complementary mass labeled ~~nucleotides~~ nucleotide.

8. (Currently amended) An apparatus comprising:

a) an analysis chamber containing at least one cantilever;

b) one or more partially double stranded nucleic acid templates covalently attached to the at least one cantilever, wherein the at least one cantilever is fabricated to respond to deflection and/or resonant frequency shift of the cantilever produced by changes in mass of the attached templates by addition of at least one complementary mass labeled nucleotide;

c) a detection unit operably coupled to the at least one cantilever to detect deflection of the at least one cantilever; and

d) a data processing unit and control unit operably coupled to the chamber and the detection unit;

further comprising one or more polymerases in the analysis chamber which incorporate the complementary mass labeled nucleotide in a position complementary to a nucleotide of the attached templates.

9. (Canceled).

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10. (Previously presented) The apparatus of claim 8, wherein the data processing and control unit is a computer.

11. (Original) The apparatus of claim 8, wherein the detection unit comprises a laser and a position sensitive photo detector.

12. (Original) The apparatus of claim 8, wherein the detection unit comprises a piezoelectric detector, a piezoresistive detector or a piezomagnetic detector.

13. (Previously presented) The apparatus of claim 8, wherein the one or more nucleic acid templates are about 10 to approximately 100,000 nucleotides in length.

14. (Original) The apparatus of claim 8, further comprising an array of cantilevers, each associated with the same molecule.

15. (Original) The apparatus of claim 8, further comprising an array of cantilevers, each associated with a different molecule.

16. (Currently amended) An apparatus comprising:

a) an analysis chamber containing at least one cantilever;

b) one or more partially double stranded nucleic acid templates covalently attached to the at least one cantilever, wherein the at least one cantilever is fabricated to respond to deflection and/or resonant frequency shift of the cantilever produced by changes in mass of the attached templates by addition of at least one complementary mass labeled nucleotide;

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c) a piezoresistive resistor embedded at the fixed end of at least one cantilever;
d) a detection unit operably coupled to the piezoresistive resistor to detect deflection of the at least one cantilever; and
e) a data processing and control unit operably coupled to the chamber and the detection unit;
further comprising one or more polymerases in the analysis chamber which incorporate the complementary mass labeled nucleotide in a position complementary to a nucleotide of the attached templates.

17. (Original) The apparatus of claim 16, further comprising a resistance measuring device.

18. (Previously presented) The apparatus of claim 16, wherein the one or more nucleic acid templates are about 10 to approximately 100,000 nucleotides in length.

19. (Currently amended) An apparatus comprising:

- a) an analysis chamber containing at least one cantilever;
- b) the at least one cantilever coated with a substance on at least one surface;
- c) two or more partially double stranded nucleic acid templates covalently coupled to the coated surface of the at least one cantilever in a selected pattern, wherein the at least one cantilever is fabricated to respond to a mass dependent property change, deflection, or resonant frequency shift of the cantilever structures produced by changes in mass of the coupled templates by addition of at least one complementary mass labeled nucleotide;
- d) one or more polymerases in the analysis chamber;
- e) a detection unit operably coupled to the at least one cantilever to detect deflection of the at least one cantilever; and
- f) a data processing and control unit operably coupled to the chamber and the detection unit.

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20. (Original) The apparatus of claim 19, wherein the substance comprises an alloy.

21. (Original) The apparatus of claim 20, wherein the alloy is gold.

22. (Previously presented) The apparatus of claim 18, wherein the nucleic acid templates are coupled to the cantilever through a thiol group.